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Experimental Investigation of Parametric Excitation of Whistler Waves NATHAN ZECHAR, Riverside Research, VLADIMIR SOTNIKOV, JAMES CAPLINGER, Air Force Research Laboratory, MARK HOPKINS, Riverside Research — Previous theoretical work has shown that a parametric interaction between electrostatic lower oblique resonance (LOR) and ion acoustic waves (IAW) can produce electromagnetic whistler waves in a cold magnetized plasma. It was also demonstrated theoretically that this interaction can more efficiently generate electromagnetic whistler waves than by direct excitation using a conventional loop antenna. For the purpose of experimentally validating the above result, an experiment was designed and built utilizing a helicon array plasma source capable of high density and spatial uniformity. We first demonstrate the ability to directly excite whistler waves along with the familiar resonant surfaces which comprise the LOR. Next we will attempt to generate and observe ion acoustic waves as well as test their agreement with the linear dispersion relation. Finally, we will investigate the existence of any nonlinear interaction which indicates the desired parametric excitation and attempt to analyze the efficiency of this method of excitation.

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